PERMIT NO. ALS000032

Illicit Discharge Detection & Elimination

Permit Part II B.3.

City of Birmingham
Stormwater Management

ILLICIT DISCHARGE DETECTION & ELIMINATION

PERMIT PART II B.3.

Known NPDES Permitted Facilities in Birmingham per Watershed:

- Village Creek
  - 194
- Valley Creek
  - 130
- Five Mile Creek
  - 32
- Shades Creek
  - 36
- Cahaba River
  - 20

Illicit Discharge is any discharge to a municipal separate storm sewer system that is not composed entirely of storm water except discharges allowed pursuant to a National Pollution Discharge Elimination System (NPDES) Permit, which is regulated by the Alabama Department of Environmental Management. Known permitted facilities are listed at right with associated maps provided in Exhibit A.

Illicit discharges can be separated into three (3) categories based on frequency of discharge (Table 1-1 & Table 1-2):

1. **Transitory Illicit Discharge**: These are typically a one-time event. They can result from spills, dumping, and line breaks and are often the most difficult to investigate and trace back to its source.
2. **Intermittent Illicit Discharge**: These are typically discharges that occur occasionally. They can occur several hours per day, week or over the course of a year and can happen as the result of line breaks or cross connections.
3. **Continuous Illicit Discharge**: These direct connections into the MS4 can be from sanitary sewers, cross connections, infrastructure problems with a sanitary sewer system, or malfunctioning household sewage treatment systems (HSTS).

Of these three types, the Continuous Illicit Discharge is the easiest to find, investigate, trace and eliminate from the MS4. This type of discharge also has the greatest impact because of the constant pollutant loading into a water body.

Illicit discharges can also be classified based on how they enter the stormwater system. This entry can be direct or indirect.

1. Direct entry: The discharge is directly connected to the stormwater system via a pipe. This type of entry will produce discharges that are either continuous or intermittent. Direct entry usually occurs when there are sewage cross-connections, or where there are industrial and commercial cross-connections.

2. Indirect entry: Flows, which are generated outside the stormwater system, enter through stormwater inlets or by infiltrating through the joints of the pipe. Generally, indirect modes of entry produce intermittent or transitory discharges. This type of entry can include groundwater

seepage into the stormwater pipe, spills, dumping, outdoor washing activities, and irrigation from landscaping or lawns that reaches the stormwater system.

TABLE 1-1 TRANSITORY OR INTERMITTENT ILLICIT DISCHARGES

Land Use	Likely Source Locations	Condition/Activity that Produces Discharge
Residential	· Apartments · Multi-Family · Single Family Detached	· Car Washing · Driveway Cleaning · Dumping/Spills · Equipment Wash-Downs · Lawn/Landscape Watering · Septic System Maintenance · Swimming Pool Discharges · Laundry Wastewater · Improper Plumbing (e.g. garage floor drains)
Commercial	· Campgrounds/RV Parks · Car Dealers/Rental Car Company · Car Washes · Laundry or Dry Cleaners · Gas Stations/Auto Repair Shops · Nurseries and Garden Centers · Oil Change Shops · Restaurants · Swimming Pools · Service Garages	· Dumping/Spills · Landscaping/Grounds Care (e.g. irrigation) · Outdoor Fluid Storage · Parking Lot Maintenance (e.g. power washing) · Vehicle Fueling · Vehicle Maintenance/Repair · Vehicle Washing · Wash-down of Greasy Equipment & Grease Traps
Industrial	· Auto Recyclers · Beverages and Brewing · Construction Vehicle Washouts · Distribution Centers · Food Processing · Garbage Truck Washouts · Metal Plating Operations · Paper and Wood Products · Petroleum Storage and Refining · Printing	· All Commercial Activities · Industrial Process Water or Rinse Water · Loading and Un-loading Area Wash-downs · Outdoor Material Storage (e.g. fluids)
Municipal	· Airports · Landfills · Maintenance Depots · Municipal Fleet Storage Areas · Public Works Yards · Streets and Highways	· Building Maintenance (e.g. power washing) · Dumping/Spills · Landscaping/Grounds Care (e.g. irrigation) · Outdoor Fluid Storage · Parking Lot Maintenance (e.g. power washing) · Road Maintenance · Emergency Response · Vehicle Fueling · Vehicle Maintenance/Repair · Vehicle Washing

Source: Modified from *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, Center for Watershed Protection, 2004, p. 12, Table 2.

TABLE 1-2 CONTINUOUS ILLICIT DISCHARGE

Land Use	Condition or Activity that Produces Discharge
Residential	· Failed sanitary sewer infiltrating into stormwater system · Sanitary sewer connection into stormwater system · Failed septic systems discharging to stormwater system
Commercial/Industrial	· Failed sanitary sewer infiltrating into stormwater system · Process water connections into stormwater system · Sanitary sewer connection into stormwater system
Municipal	· Failed sanitary sewer infiltrating into stormwater system · Sanitary sewer connection into stormwater system

Source: *Guidelines and Standard Operating Procedures for Stormwater Phase II Communities in Maine*, Casco Bay Estuary Partnership.

ILLICIT DISCHARGE DETECTION & ELIMINATION PROGRAM SUMMARY

In accordance with the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, issued on March 31,2018, the City is required to implement an ongoing program to detect and eliminate illicit discharges into the MS4, to the maximum extent practicable (MEP). MEP is the technology-based discharge standards and controls necessary for MS4s to reduce pollutants in storm water discharges that was established by Section 402(p) of the Clean Water Act. These standards and controls may consist of a combination of best management practices (BMPs), control techniques, system design and engineering methods, and such other provisions for the reduction of pollutants discharged from the MS4 and as described herein. This section of the SWMPP will include all items listed below:

- ✓ A Map of the City's MS4 and associated major outfalls
- ✓ An ordinance to prohibit non-stormwater discharges to the MS4
- ✓ A dry weather screening program
- ✓ Procedures for tracing the source of a suspect illicit discharge
- ✓ Procedures for the elimination of an illicit discharge
- ✓ Procedures to notify ADEM of suspicious illicit discharges from another MS4
- ✓ A public notification mechanism for reporting illicit discharges
- ✓ A training program for City staff in the administration of this program element of the SWMPP
- ✓ Post the City Stormwater Protection Ordinance on the City's Stormwater Management Website

A map of the City's MS4 and associated major outfalls is found in Exhibit A. Discharges from the following activities will not be considered a source of pollutants to the MS4 when properly managed to ensure that no potential pollutants are present, and therefore shall not be considered illicit discharges unless determined to cause a violation of the provisions of the Alabama Water Pollution Control Act (AWPCA), Clean Water Act (CWA) or the Stormwater Pollution Control (SPO) Ordinance No. 14-198:

- Water line flushing (including fire hydrant testing)
- Landscape irrigation water and/or lawn watering

- Diverted stream flows carried out in accordance with applicable law
- Rising ground water
- Building pressure wash water without detergents
- Uncontaminated ground water infiltration to storm drains
- Uncontaminated pumped ground water
- Discharges from potable water sources
- Foundation and/or footing drain water (not including active groundwater dewatering systems)
- Water from crawl space pumps
- Air conditioning condensation
- Springs
- Street wash water
- Non-commercial or charity car washes
- Individual residential washing of vehicles
- Discharges from natural riparian habitat and/or wetlands
- Swimming pool discharges (only if dechlorinated)
- Discharges or flow from firefighting activities and discharges determined by the fire chief as being necessary to protect public health and safety

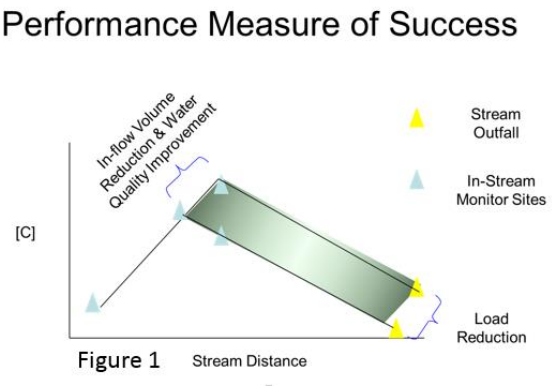
A copy of the City's Stormwater Protection Ordinance to prohibit non-stormwater discharges is also provided in Exhibit C and posted on the City of Birmingham's Stormwater Management Website at Stormwater Protection Ordinance No. 14-198.

DRY WEATHER SCREENING AND PROCEDURES TO IDENTIFY IDD&E SOURCES:

The City of Birmingham continues to work to improve the quality of storm sewer mapping throughout the City. It is estimated that at present approximately 30% of the City's storm sewer system is fully mapped. On October 4, 2013, the City met with ADEM staff to discuss a new water quality monitoring strategy for Birmingham (*see Water Quality Monitoring & Reporting section*). The strategy recommended a change to the method of water quality monitoring procedures that would address existing pollution source controls to bimonthly and pursue a more proactive approach to investigate flowing outfalls (from a 36" or greater pipe or box culvert) into the City during dry periods (no rainfall event within the past 72 hours).

Water Quality staff shall perform in-stream sampling (provided in Exhibit A) routinely on a bi-monthly basis at all sites regardless of rainfall conditions. Rainfall measures will be identified

and reported for each three day period prior to sampling and on the day of sampling to ensure actual rainfall conditions at the time of collection. In the event that a discharge (from a 36" or greater pipe) is discovered flowing while sampling and there has been no rainfall event within the past 72 hours, field parameters are measured using a turbidity meter, stormwater kit and Hydrolab or YSI with results being recorded onto an Outfall Reconnaissance Inventory (ORI) form provided in Exhibit B. A separate ORI form is used for each outfall observed.



If field parameters indicate a possible illicit discharge at the suspected outfall, completed ORI and Bi-Monthly Water Quality forms are turned over to the IDD&E staff for further evaluation. Also during a regularly scheduled sampling event, samples are collected and relinquished to a certified laboratory (Birmingham Water Works Board) for analysis. Upon receiving lab results, data is analyzed and graphed to identify peaks. By focusing on reducing the peak in-stream pollutant concentration, either in-flow volumes and/or water quality, pollution will decrease in the outfall (Figure 1). Once peaks are identified using lab analysis data and further investigated to narrow the source location, it is then relinquished over to the IDD&E staff to further trace the source of pollutant. In essence, when a priority outfall is discovered to be flowing during dry periods, the instream monitoring staff would evaluate the stream peaks (upstream and downstream) to determine whether or not a consistent pattern of pollution is emerging at a particular location. If so, the inflow would be identified as a potential pollutant source and evaluated throughout the associated sub-basin(s) to determine its source. This would involve the IDD&E staff, two staff dedicated to this effort, for the purpose of investigating pollutant sources and seeing that they are eliminated.

There are a number of different techniques that can be utilized to trace for an illicit discharge. Those techniques are: visual inspections, dye testing, smoke testing and televising/video inspections. Each technique listed must be fully understood and its limitations. When discharges at an outfall are suspected to have an illicit discharge, the next steps includes containing and/or treating the illicit discharge, tracing the source of the illicit discharge and eliminating the identified illicit discharge. Following are the source tracing techniques of which one or more may be employed to trace the source of an illicit discharge. Among all the techniques, the visual inspection/manhole and storm drain network technique will be applied most times for tracing the source. Since source tracing techniques are costly in terms of labor and direct analytical costs, it is important to prioritize the area for investigation through preliminary watershed evaluation.

Visual inspections along the conveyance system will be a primary technique that will be used for tracing illicit discharge sources. This illicit discharge source tracing process starts at the MS4 outfall where the illicit discharge has been noticed. The next step is to work "upstream" from this location – that is moving up the storm drainage system to the first manhole. Check this manhole to see if there is evidence of flow. If flow is observed at this manhole, then field personnel will move to the next upstream manhole. Keep moving upstream until no flow or low

flow is observed. When the flow is observed at manholes, they will be inspected for the physical indicators similar to those described earlier in this document. The storm drain maps will be used as field personnel move up stream to understand the origin of the junction lines which joins the storm drain. When there is no flow or low flow observed in the upstream location this indicates that the illicit discharge source between the last downstream manhole and the low or no flow manhole. Also when the physical indicators of flow at a particular manhole show that there is no illicit discharge at a manhole then the illicit discharge source is determined to be downstream from that manhole.

Dye testing involves flushing non-toxic dye into various plumbing systems (i.e. – toilets, floor drains and sinks. Field personnel will then observe all storm sewer and sanitary sewer manholes, and storm sewer outfalls in the drainage network for the presence of dye. Utilization of dye testing will assist in determining the exact location of the illicit discharge. Permission will be required from private property/building owners prior to starting a dye test procedure.

Smoke testing involves injecting non-toxic smoke into storm sewer lines and then noting the emergence of smoke from sanitary sewer vents in illegally connected buildings or from cracks and leaks in the storm sewer lines. This method will be used only during special circumstances when a good storm sewer map is not available for a location and there are known problems of connection issues. Prior to smoke testing, all citizens in the location and all appropriate public agencies will be informed of the process. This technique will be used only when no other technique found to be effective in tracing the source, the City's effort will be to avoid the use of smoke testing.

The last method in determining the origin of an illicit discharge source is televising the storm line. Video cameras can be used by either pushing or using a mobile video unit. Both cameras will provide detailed information as to where the infiltration or connection is located within the MS4 system. The staff can analyze the video recorded to identify where illegal connections are made to the storm drain. As this technique is time-consuming and expensive, the City may use this technique only if other techniques are found to be ineffective for locating illicit discharge source.

PROCEDURES TO ELIMINATE AN IDD&E DISCHARGE:

The City performs visual inspections of the drainage area to identify possible locations for follow-up inspections. Once a basin has been pinpointed to a particular property that may be contributing to the discharge, staff notifies the Owner/Operator that an illicit discharge has been identified. However, if staff is unable to identify a possible source, visual inspection of the storm drainage area begins, working from the outfall source to upstream areas, lifting manhole covers until source water no longer exists. If not successful during manhole inspections a dye test may be performed to trace flow back to the original source location. Potential sources are identified and the inspector determines whether the facility has floor drains or other possible locations (plumbing) that may connect to the storm drainage system. If the dye test proves not to be successful a smoke test may also be performed and the local Fire Department notified of its location, date and time. Also if the known source is from a facility with a NPDES permit, ADEM is also notified in advance of any actions being taken. The most common issues addressed have

been: hand car wash discharges, pet grooming facilities, and businesses with poor housekeeping/best management practices (BMPs).

Whenever an illicit discharge is suspected, regardless of how identified, an IDDE Incident Tracking Sheet (Exhibit B) is completed and a preliminary desktop assessment is prepared to identify a possible source of discharge. A preliminary desktop assessment can consist of but is not necessarily limited to obtaining/reviewing drainage maps of the area, parcel ID verification, Business License verification, SIC/NAICS Code verification, and NPDES Permit verification. In the event that the illicit discharge is from a facility without an NPDES permit discharging into the City's MS4, the facility Owner/Operator will receive a non-compliance notice and followed by a written warning and a notice of Violation (NOV) if levels of compliance are not achieved. Any person receiving a NOV may appeal to the Appeal's Board within ten (10) days of receiving the violation to the City clerk's office. The Appeals Board will hold a hearing and issue a decision in writing no later than thirty (30) days following the close of the hearing. If the Owner/Operator continues to remain non-compliant, the City may seek to recover in a civil suit authorized by State law.

PROCEDURES TO NOTIFY ADEM OF SUSPICIOUS ILLICIT DISCHARGES FROM ANOTHER MS4:

If a suspected illicit discharge enters the City's MS4 boundary from an adjacent MS4, the City will notify the adjacent MS4 and the ADEM Water Division within 48 hours of observing the suspected illicit discharge. When the source of an illicit discharge is located, the next step in the IDDE program is to eliminate the identified source. Typically, the City will respond to the illicit discharge source in a graduated manner, beginning with the efforts to obtain voluntary compliance and escalating to severe enforcement actions if compliance is not obtained. In the event that the illicit discharge is from a facility with an NPDES permit discharging into a Water of the State, the City will notify and work with ADEM to achieve compliance. (Exhibit B). Additionally, all NPDES permitted facilities will be mapped and checked for business license violations.

PUBLIC NOTIFICATION MECHANISM FOR REPORTING ILLICIT DISCHARGES:

The City has a complaint system in which citizens can make a phone call to 311 regarding stormwater related issues. In addition, the City receives information regarding the citizen complaints from other agencies, such as ADEM, related to illicit discharges or disposals. The City has published its citizens' call-in number on the City stormwater website and is often advertised in flyers and other material distributed to public.

The 311 Call Center was developed to assist Birmingham citizens in addressing non-emergency related issues. The 311 Call Center serves as a liaison for various City departments by taking, processing, routing, tracking and reporting on citizens' non-emergency related requests and concerns. It issues service requests to departments and follows up to ensure timely resolutions. When the citizen describes any of the items listed below, the operator will issue the appropriate request which initiates the escalation process, and an email will be sent to Stormwater staff for further follow-up:

- Foul odor
- Chemical spills
- Construction site erosion
- Sewage
- Oil sheen
- Dead fish
- Wash water
- Dumping

Stormwater staff will inspect the location of reported suspected illicit discharge during which the staff will monitor for physical chemical conditions. Staff will follow similar procedures for illicit discharge detection and elimination and reporting as presented in the *"Procedures to Eliminate an IDD&E Discharge*" of this document.

IDD&E TRAINING PROGRAM ELEMENT:

Stormwater staff attends a variety of stormwater/water quality related conferences, workshops and seminars annually. The City will continue to encourage training for Stormwater staff during the permit cycle.

CONCLUSIONS

The City will assess its IDDE program on an annual basis to determine if it has been effective and efficient in eliminating illicit discharges to the City's MS4.

Future Direction:

Stormwater staff will develop and deliver a training program for in house employees to detect and report an illicit discharge appropriately.

Exhibit A
Maps

Exhibit B
Forms

Exhibit C
Ordinance